Token Ring Switching Module Installation Guide

For the LANplex 6000

About This Guide

This guide includes:

- An inventory of items shipped with your LANplex 6000 module
- An overview of the Token Ring Switching Module (TRSM)
- Instructions for installing and replacing TRSM
- A description of the TRSM's components, including media options and diagnostic LEDs
- Pin-out information for the TRSM

Information on installing modules is also included in the *LANplex 6000 Getting Started* guide.

NOTE: *Prior to installing the TRSM module, LANplex system software revision 6.0 or later must be installed.*

CAUTION: *In order to run software revision 5.0 or later on the LANplex 6000 you must have the new LMM Plus installed in your system. To verify if you have an LMM Plus installed check the module's ejector tab to ensure it says* **LMM+**.

Audience *This guide is intended for trained technical personnel only.*

Taking Inventory

Your package should contain the following items.

- 1 LANplex 6000 TRSM
- 1 *LANplex 6000 Software Release Notes*
- 1 disposable electrostatic discharge (ESD) wrist strap
- Operational diskette(s) (UNIX and DOS)
- MIB diskette(s) (UNIX and DOS)

Contact 3Com Customer Service Organization at 1-800-876-3266, option 2, if any item is missing.

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TRSM Description

The Token Ring Switching Module (TRSM) is designed to add Token Ring (TR) switching functionality to the LANplex 6000, providing the most cost effective solution for introducing segmentation for today's Token Ring networks, while allowing you to prepare for future higher bandwidth requirements such as multimedia applications.

The TRSM has eight shielded RJ-45 token ring ports on the front of the module and one FDDI backplane attachment which may be connected to any of the three LANplex chassis FDDI backplanes. All eight token ring switch ports support a full ring of 260 stations, with two of the ports able to accommodate direct station attachment for dedicated bandwidth to file servers and other critical resources. The shielded RJ-45 ports allow for attachment via Type 1 STP or Type 3, 4, or 5 UTP copper cable. Each port is independently configurable to support either 4 Mbps or 16 Mbps operation.

TRSM Configurable Bridge Modes

The TRSM is architected to support both source routed or transparent traffic types in the following modes:

- Transparent (T)
- Source Routing (SR)
- Source Routing-Transparent Bridge (SRT)

Transparent

The TRSM fully complies with the IEEE 802.1d bridging standard, which means that the module:

- Learns source addresses from packets transmitted by stations on LANs attached to TRSM ports
- Ages addresses of stations on attached LANs that have not transmitted a packet for a prolonged time
- Stores and forwards packets from one attached LAN to another
- Uses the Spanning Tree protocol for loop detection

The TRSM automatically "learns" the MAC-layer addresses of the stations on its attached networks, and then forwards packets to their appropriate destinations. Packet forwarding is based on learned or statically configured MAC addresses. The TRSM can learn up to 8192K addresses. Additional addresses are learned as addresses are aged out. All addresses are stored in

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nonvolatile RAM so they will survive a power loss or system initialization. Source Routed traffic is not forwarded while in this mode.

Source Routing (SR)

In Source Routing (SR), the packet contains information in the Route Information Field (RIF), which specifies the route the packet should follow in order to reach its destination. Through the process of route discovery, the packet determines various routes available and embeds this information as Ring Numbers and Bridge Numbers within the RIF. The bridge compares the RIF to its configured Bridge Numbers and Ring Numbers for each port and forwards the packet if appropriate. The TRSM utilizes one hop between any two ports on the module.

For Spanning Tree, the network mesh topology is reduced to a single path utilizing IEEE 802.1d Spanning Tree.

Transparent traffic is not forwarded while in this mode.

Source Routing Transparent (SRT)

The Source Routing-Transparent (SRT) operation complies with the 802.1d standard which provides bridging for both Source Routing and non-Source Routing protocols. It uses the Route Information Indicator to differentiate between SR and non-SR packets and applies the appropriate bridging method on each packet received.

To configure the Bridging mode, see Chapter 11: *Administering the Bridge* in the *LANplex 6000 Administration Console User Guide*.

TRSM Configurable Protocol Translation Modes

Protocol addresses on Token Ring are defined in non-canonical format while FDDI is defined in canonical format. For a workstation on Token Ring to communicate with a server on FDDI, it is necessary to reformat or translate these embedded protocol address. The TRSM supports translation between Token Ring and FDDI for the following protocols: IP, IPX, NetBIOS, and SNA.

Translation is not necessary if FDDI is only used as a transport media between TRSMs. Since this feature may degrade performance, it is recommended that you disable the translation feature when FDDI is used solely as a transport media.

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TRSM Installation

This section describes the following:

- Module safety information
- Installation information
- LED activity during installation
- Pin-out information

Information on installing modules is also included in the *LANplex 6000 Getting Started* guide.

Safety Information

Electrostatic discharge (ESD) damage occurs when the module is improperly handled. ESD can damage components on a module, causing complete or intermittent failures.

To prevent ESD-related damage, handle the module in the following manner:

- Always wear the ESD wrist strap provided with the module, ensuring that it makes good skin contact and that the alligator clip is connected to a suitable ground. See Figure 3 on page 7.
- Keep the module in its antistatic shielded bag until you are ready to install it.
- Do not touch the components, pins, leads, or solder connections.
- Always handle the module by its edges.

Additionally, you should cover every empty slot with a blank faceplate to protect the system from dust or other foreign substances, and to ensure proper system cooling.

Prior to Installation

Before you install your new module, follow the appropriate pre-installation instructions below:

Read if installing in an empty slot

Your LANplex system is shipped with no modules installed and with protective faceplates covering the installation slots. Initial installation requires that you remove the protective faceplate covering the selected installation slot prior to installing the option module.

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To remove the faceplate:

1 Unscrew the securing screws on the module's faceplate. See Figure 1.

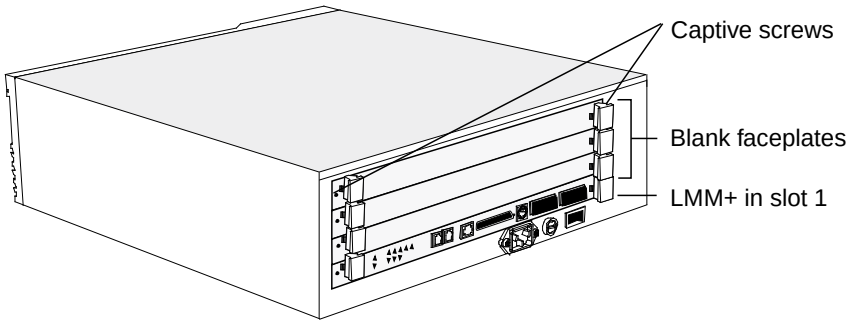

Figure 1 LANplex 6004 with Blank Faceplates

2 Pull the faceplate away from the system.

Read if replacing a TRSM

You can replace a module while the system is powered on. Replacing the module requires that you remove the attached cables from the module's ports prior to installing the new module.

NOTE: *Ensure that there is a record of where the cables are attached so that you can correctly re-connect them to the new module.*

CAUTION: *Inserting and extracting a TRSM erases all information stored in NVRAM on the TRSM. Before removing the installed TRSM, save all nonvolatile data using the NV data save functionality on the system's Administration Console. This information can be restored using the NV restore functionality. See the LANplex 6000 Administration Console User Guide for information on saving, restoring, and resetting nonvolatile data. Inserting and extracting a module will cause a warm system reboot.*

To remove a module:

1 Discharge yourself of static electricity by placing the ESD wrist strap on your wrist and clipping the alligator clip to the mounting screw located next to the black ground symbol on the system's right mounting bracket. See Figure 3. If your system does not have mounting brackets, touch the rear panel.

2 Disconnect the cables from the module's ports.

3 Unscrew the securing screws on the module's faceplate. See Figure 1.

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4 Grasp the inject/eject handles of the module and push them outward as shown in Figure 2.

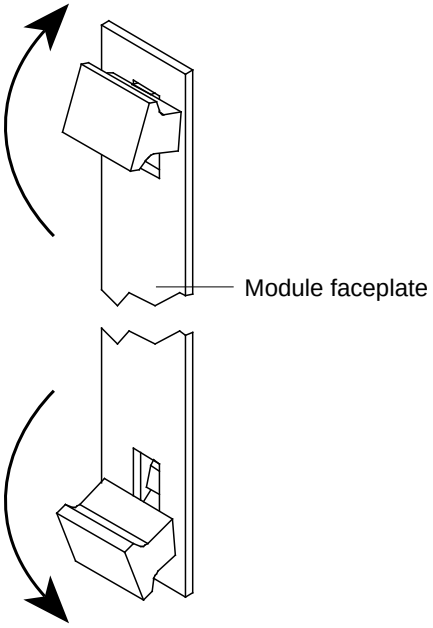

Figure 2 Handles in Outward Position

5 Remove the module from the system.

6 Place the module in its antistatic bag.

Installing the TRSM

The installation procedure takes only a few minutes to complete. You need a small, flat-blade screwdriver.

NOTE: *Only the LMM may be inserted in slot one of the LANplex system. The system will not operate if any other module is inserted into slot one. Slot one of the LANplex 6004 is the bottom slot, and slot one of the LANplex 6012 is the first slot on the left.*

To install the TRSM in an empty slot in the LANplex system, perform the following steps:

1 Discharge yourself of static electricity by placing the ESD wrist strap on your wrist and clipping the alligator clip to the mounting screw located next to the black ground symbol on the system's right mounting bracket. See Figure 3. If your system does not have mounting brackets, touch the rear panel.

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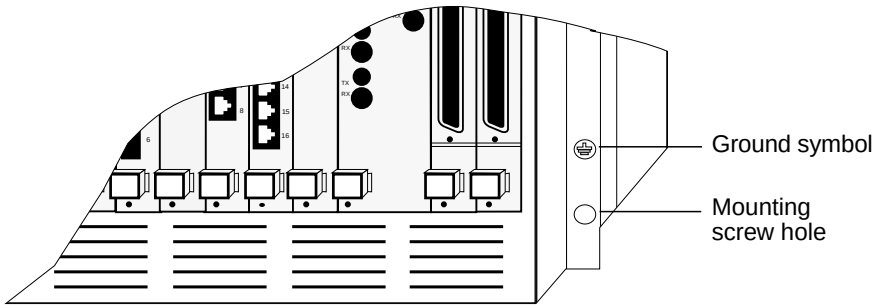

Figure 3 Ground Symbol for Static Discharge

2 Remove the TRSM from its antistatic bag.

3 Make sure that the inject handles are in the outward position. See Figure 4.

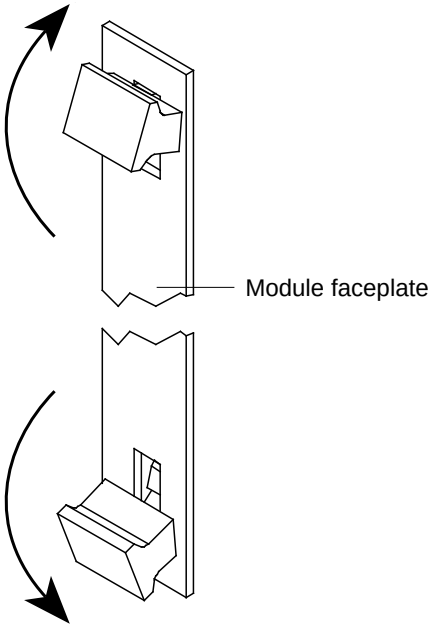

Figure 4 Handles in Outward Position

4 Orient the TRSM to insert it into the LANplex system. For a LANplex 6012 system, orient the module so that its labeling is upright. For a LANplex 6004 system, the module's labeling should be on your left.

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WARNING: *If the system is powered on when you are installing a module, do not insert any metal objects, such as a screwdriver or a finger with jewelry, in the open slot. This could cause burns or other bodily harm, as well as system damage.*

5 Direct the module into the chassis by placing it between the guides of the selected slot and sliding the module until it stops. The module stops sliding when the inject handles make contact with the front of the chassis.

Figure 5 shows a TRSM being installed in a 6012 system. Figure 6 shows a TRSM being installed in a 6004 system.

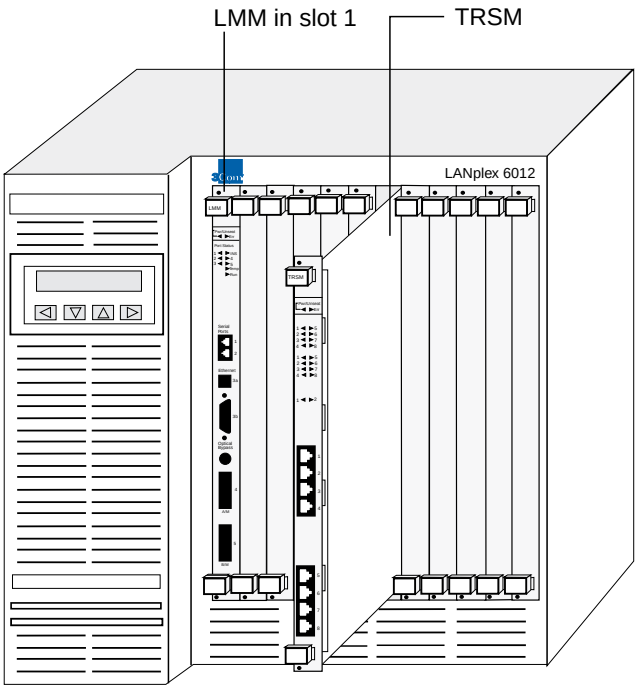

Figure 5 Guiding an TRSM Module into a LANplex 6012

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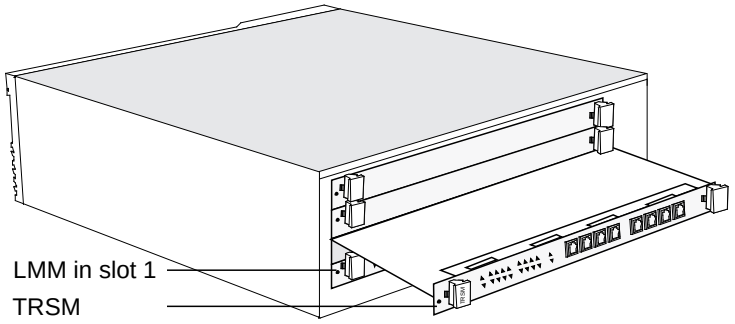

Figure 6 Guiding an TRSM Module into a LANplex 6004

6 Inject the TRSM into the chassis.

- If the system is powered on, when the **Power/Unseat** LED on the panel's faceplate is yellow, inject the TRSM into the chassis by grabbing both ejector/injector handles and simultaneously push them inward. See Figure 7.
- If the system is not powered on, once you feel a slight resistance, inject the TRSM into the chassis.

7 Relocate the inject handles back to their center position by gently pushing them inward. See Figure 7.

This locks the TRSM into the chassis. The **Power/Unseat** LED lights green when the TRSM is seated.

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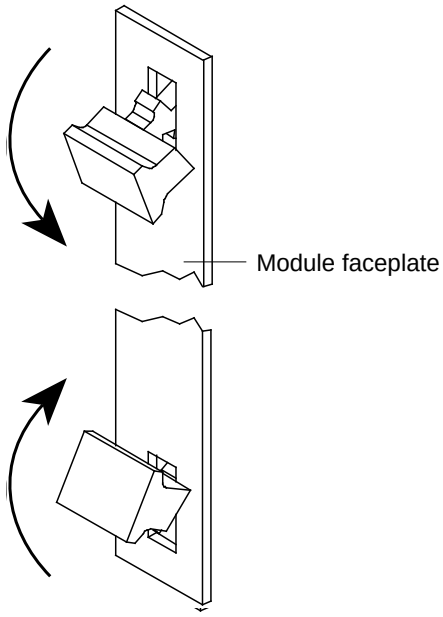

Figure 7 Handles in Inward (Inject) Position

NOTE: *Do not push the handles outside the center position or you will eject the module. These handles act as "ejectors" when pushed outward and "injectors" when pushed inward.*

8 See the following section on "LED Activity" to verify that the TRSM has been properly installed.

9 Tighten the TRSM's securing screws using a flat-blade screwdriver.

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LED Activity

If the system is powered on, you can verify that your module is properly installed by observing its LEDs. Follow the troubleshooting suggestions below if LED activity is not normal.

Normal LED Activity

The following LED activity is normal during installation:

- The **Power/Unseat** LED lights yellow briefly when the module is inserted far enough into the chassis to use the inject/eject handles.
- The **Err** LED lights yellow temporarily after insertion while the module runs diagnostics.
- The **Power/Unseat** LED lights green, indicating that the module is powered on.

  Once you have completed the installation procedure, only the green **Power/Unseat** LED should remain lit.

Troubleshooting

If LED activity is not normal, check the troubleshooting suggestions listed below.

- If the **Power/Unseat** LED remains yellow, the module is not fully seated in the chassis. Eject and re-insert the module as described in the installation procedure starting on page 6.
- If the **Err** LED remains yellow, contact 3Com Technical Support for additional assistance.
- If the **Power/Unseat** LED does not light green when the module is powered on, contact 3Com Technical Support for assistance.

NOTE: *For 3Com Technical Support information, see Appendix B: Technical Support in the LANplex 6000 Getting Started guide.*

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TRSM Components

The main components of the TRSM include board status LEDs, eight port status LEDs, eight port speed LEDs, two port mode LEDs, and eight Token Ring shielded RJ-45 connectors. Figure 8 shows the front panel of the TRSM.

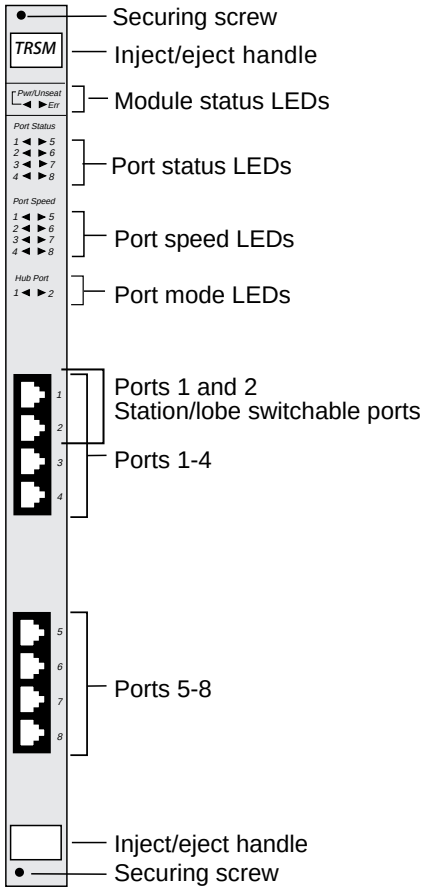

Figure 8 TRSM Option Module

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Status LEDs

Each TRSM contains two **Module Status** LEDs and eight **Port Status** LEDs. Depending on the condition, each LED is either green or yellow. Table 1 describes these LEDs.

Table 1 FDDI/Ethernet Switching Module LEDs

LEDs	Name	Color	Description
Module Status	**Pwr/Unseat**	Green	Indicates that the module is powered on
		Yellow	Indicates that the module is not fully plugged into the backplane
	Err (Error)	Yellow	Indicates either that an error has occurred or that the module has failed a diagnostic procedure
Port Status	**Port Status** 1 - 8	Green	Indicates that the associated port is active
		Yellow	Indicates that an error condition has occurred with the associated port or that the port is disabled
	Port Speed 1 - 8	Green	Indicates that the port is running at 16Mbps
		Yellow	Indicates that the port is running at 4Mbps
	Port Mode 1 - 2	Yellow	Indicates that the ports are configured as lobes and can accept an external station connection
		Green	Indicates that a station is attached to the lobe port

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Pin Assignments

Table 2 provides the pin assignments for the TRSM's eight (RJ-45) ports in station mode. Table 3 provides the pin assignments for ports 1 and 2 when configured as lobes.

Table 2 Station Mode TRSM (RJ-45) Pin Assignments

Pin No.	Signal	Description
1		Not used
2		Not used
3	TX-	Transmit-
4	RX+	Receive+
5	RX-	Receive-
6	TX+	Transmit+
7		Not used
8		Not used

Table 3 Lobe Mode TRSM (RJ-45) Pin Assignments

Pin No.	Signal	Description
1		Not used
2		Not used
3	RX-	Receive-
4	TX+	Transmit+
5	TX-	Transmit-
6	RX+	Receive+
7		Not used
8		Not used

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